

# E-Horti: Empower Farming With Online Marketplace Application Based On Full Stack Web Development

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**Abstract-** In urban areas, sustainable food supply is at immense pressure, due to exponential population growth, expanding urban dwellings, limited natural resources and climatic changes, Common people are facing this problem, also the intermediates making more profit than the cultivators are to be noted. In order to benefit farmers and to break down the concept of intermediates we come up with E-Horti app. ( a buy/sell mode) E-Horti App which is an online marketplace where farmers and entrepreneurs can connect their crops to the outside world for business. i.e. connecting horti crops to outside world through technology. Buyers/sellers can search for horticulture crops 24x7 near their location and post their requirements, send enquiries to buyers/sellers in offline mode also. A chat and call option to the buyer/seller is also made available for their purchase and for price negotiation. We create employment and open new e-market opportunities for fruit and vegetables to play a pivotal role in fighting the micronutrient deficiencies and over nourishment. It also motivates youngsters, differently abled, transgender and other marginalised sections of the society for business. It improves their income, status, good health, confidence and also provides nutritional security to the consumers through horticulture crops and in turn improves the society.

## I. INTRODUCTION

Horticulture is a branch of agriculture that focuses on the cultivation, production, management, and study of plants, including fruits, vegetables, flowers, herbs, and ornamental trees and shrubs. It encompasses various practices aimed at improving plant growth, health, and productivity for both commercial and non-commercial purposes. Horticulture involves a combination of science, art, and technology to achieve desired outcomes in plant cultivation.

### Key aspects of horticulture:

#### Plant Propagation:

Horticulture involves various methods of plant propagation, including seeding, grafting, cutting, layering, and tissue culture

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Horticulture involves various methods of plant propagation, including seeding, grafting, cutting, layering, and tissue culture. Each propagation method has its advantages and is selected based on factors such as plant species, desired outcomes, and available resources

#### Greenhouse Management:

Greenhouses provide controlled environments for plant growth, allowing horticulturists to extend growing seasons, protect plants from adverse weather conditions, and optimize growing conditions. Greenhouse management involves regulating temperature, humidity, light levels, and ventilation to create ideal growing conditions for specific crops

#### Landscape Design and Maintenance:

Horticulture encompasses the design, installation, and maintenance of landscapes, gardens, parks, and urban green spaces. Landscape designers use principles of design, such as balance, proportion, and harmony, to create aesthetically pleasing and functional outdoor spaces.

#### Research and Innovation:

Horticultural research aims to improve crop varieties, develop sustainable production methods, and address

emerging challenges such as climate change and food security. Advances in biotechnology, genetics, and agronomy contribute to the continuous improvement of horticultural practices and crop productivity

## II. BACKGROUND

### Overview of the project

The project aims to deploy a full stack web application to benefit farmers. and to break down the concept of intermediates we come with E-Horti app

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The project aims to deploy a full stack web application to benefit farmers and to break down the concept of intermediates we come up with E-Horti app. ( a buy/sell mode) This application acts as a safe platform for people. It provides basic food-requirements for common people during emergency instances (e.g. flood , pandemic) as they cultivate in their home. It increases quality, nutritional value, and resistance to insects, diseases, and environmental stresses we propose E-Horti App which is an online marketplace where farmers and entrepreneurs can connect their crops to the outside world for business. i.e. connecting horti crops to outside world through technology. Buyers/sellers can search for horticulture crops 24x7 near their location and post their requirements, send enquiries to buyers/sellers in offline mode also. A chat and call option to the buyer/seller is also made available for their purchase and for price negotiation. We create employment and open new e-market opportunities for fruit and vegetables to play a pivotal role in fighting the micronutrient deficiencies and over nourishment..

### Motivation of the Problem:

The project's motivation stems from the pressing need to address the challenges faced by farmers and people involved in agriculture practices. It is quite common that most of the homes in India, have a tree or plants giving fruits, vegetable, flowers etc. The major horticultural crops grown are mango, banana, citrus, apple, pineapple and in case of vegetables are potato, onion, tomato, and other seasonal vegetables. In India, we have sunlight throughout the year, good labor resources and suitable climatic conditions, which gives us the high potential for successful and profitable commercial horticulture.

### Objective of the project:

The primary objective of the project is to deploy web application 'E-Horti App' which will be greatly beneficial to the horticulture community. Buyers/sellers can search for horticulture goods and services 24x7 near their location and post their requirements, send enquiries to buyers/sellers in offline mode as well. A chat and call option to the buyer/seller is also made available for the requirement and price negotiation.

### Usefulness / Relevance to the Society:

The project holds immense usefulness and relevance to society by addressing critical challenges faced by farmers and we create employment and open new market opportunities for fruit and vegetables to play a pivotal role in fighting the micronutrient deficiencies .

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Horticulture is one of the best practices where all the varieties of fruits, berries, nuts, vegetables, flowers, trees, shrubs, and turf are grown. It increases quality, nutritional value, and resistance to insects, diseases, and environmental stresses.

### Crop Production:

Horticulturists cultivate crops for food, ornamental, medicinal, and industrial purposes. Crop production techniques include soil preparation, irrigation, fertilization, pest and disease management, and crop rotation. Emphasis is placed on maximizing yields while minimizing environmental impact and resource usage.

### Soil Management:

Soil plays a crucial role in plant growth and health. Horticulturists focus on maintaining soil fertility, structure, and moisture levels. Soil management practices include soil testing, amendment with organic and inorganic materials, and erosion control measures.

### Water Management:

Efficient water management is essential in horticulture to ensure optimal plant growth and resource utilization.

Techniques such as drip irrigation, mulching, and water Recycling are employed to conserve water and minimize wastage.

### **Integrated Pest Management (IPM):**

IPM is an environmentally sensitive approach to pest control that emphasizes the use of biological, cultural, and mechanical methods alongside chemical pesticides. Horticulturists monitor pest populations, implement preventive measures, and employ natural predators and beneficial organisms to manage pests effectively.

## **III. LITERATURE SURVEY**

### **(i)A Comprehensive Study on Smart Agriculture Applications in India**

Neena Alex, C. C. Sobin & Jahfar Ali, 2020

**Methology:** The authors surveyed various smart agricultural applications developed and proposed a taxonomy for classifying them.

**Merits/demerits:** The paper explores the viability of deploying IoT-based technologies in agricultural sectors along machine learning techniques to optimize resource utilization, planning and cultivation, marketing, pesticide selection, price prediction, etc.

### **(ii)Trends in the Use of Webapps in Agriculture: A Systematic Review**

Mariuxi Tejada-Castro, Carlota Delgado-Vera, Mayra Garzón-2021

**Methology:** The authors identified phases of the crop cycle which has the most technological support, Web or mobile, and what functionalities the applications carry out, as well as to detect the tendency of use by the farmer.

**Merits/demerits:** Tools were used that allow us to make descriptive statistical metrics, where they proved that, due to their versatility and multiplatform, the web applications are fulfilling this objective, covering in its entirety all the phases of the crop

### **(iii) A comprehensive analysis of the advances in Indian Digital Agricultural architecture**

Acharya Balkrishna, Rakshit Pathak, Sandeep Kumar, Vedpriya Arya , Sumit Kumar Singh ,2023

**Methology:** ICT-based interventions such as smart farming and precision agriculture are helping to improve the output of traditional agricultural systems and drive them toward sustainability.

**Merits/demerits:** Data-driven technologies like remote sensing, smart sensors, and IoT-based devices constructed over AI/ML algorithms have become a fundamental aspect of agriculture that assists farmers with critical decision-making

### **(iv)A Study on Farmers' Marketing Strategies for Agricultural Produce and Problems Faced by the Farmers during COVID-19 Lockdown with Reference to Chittoordistrict, Andhra Pradesh.**

P. Bayya Reddy, M.S.R. Mariyappan

**Methology:** In this study, it has been ascertained that there is a plight in the farmers to market their harvest during lockdown. This study showed that there is a fall in supply of agricultural produce because of lower demand due to COVID-19 lockdown.

**Merits/demerits:** The farmers have endeavored to market their produce in village markets and semi rural towns with their own marketing strategies during COVID-19 lockdown

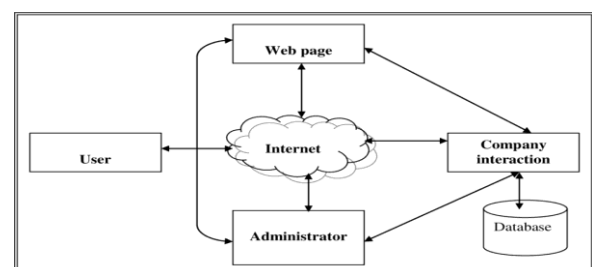
### **(v) Analysis and Research on the Marketing Strategy of Agricultural Products Based on Artificial Intelligence.**

Wang Hongbing ,Gao Jing, Kang Bohan, Lyu Peng, 2023

**Methology:** The limitations of conventional methods for classifying agricultural products, this article presents a classification model that combines factor analysis with an enhanced support vector machine (SVM) based on genetic algorithms (GAs).

**Merits/demerits:** The improved method is capable of distinguishing agricultural product quality categories rapidly and precisely, significantly improving the classification accuracy of agricultural product quality, and being broadly applicable to the evaluation of agricultural product quality

## **IV. SYSTEM DESIGN**



**Fig:4.1 System Design**

**Modules and Methodology**

Working methodology for E-HORTI:

1. Visit the Official E-HORTI Website or the Mobile app  
Go to the official E-HORTI website (E-HORTI has regional sites for different countries and areas).  
Scroll down to the bottom of the homepage if needed, where you can select a different country or city from the section that reads “E-HORTI Close to you.”
2. Select the “Sell Your Item Now” Button:  
Look for the “Sell Your Item Now” button at the top right corner of the home page.
3. Choose an Appropriate Category:  
Select the most fitting category and subcategory for your item. This ensures that your product is easily found by potential buyers.
4. Create an Engaging Ad Title:  
In the form, add a suitable title for your product. Make it catchy to attract more customers (e.g., “10 kg country tomato”).
5. Provide a Detailed Description:  
Describe your product completely and succinctly. Include information about the product’s condition, purchase date, and any important features or faults.
6. Complete the ‘Seller Information’ Field:  
Ensure all information is up-to-date and correct. Potential customers will use this information to contact you.
7. Add High-Quality Images:  
Include images that show the condition of the product. High-quality images make your ad more attractive.
8. Review and Post Your Ad:  
Double-check all details before selecting the “Post” option. Accuracy is crucial to avoid posting incorrect advertisements.

**Buying Products on E-HORTI:**

1. Search for Your Desired Product:

Use the search box to find the exact description of the product you want (e.g., fruits, vegetable etc.). Be specific for better results

2. Select Your Location:

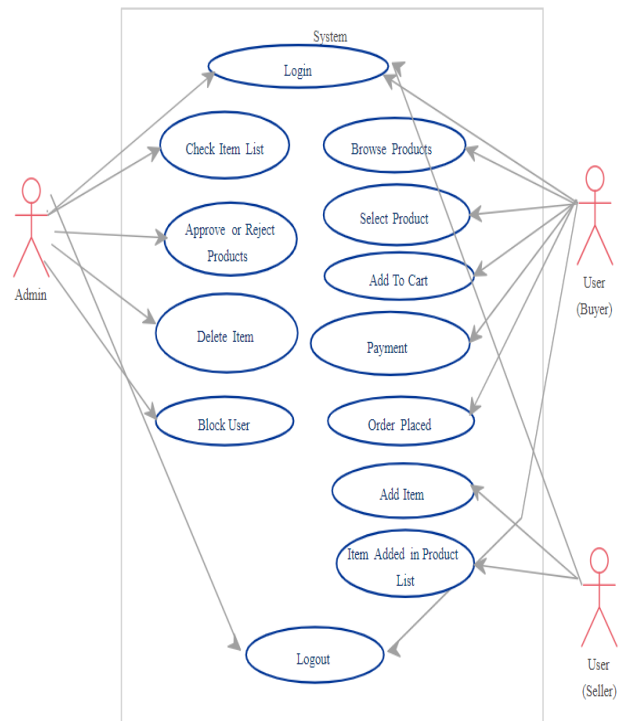
Enter your correct state so that buyers and sellers can meet conveniently.  
If the buyer is in a different state or region, it may complicate the purchase.

3. Browse Available Products:

Read product details and view pictures carefully.  
Ensure that any product you consider meets your needs and is priced fairly.



**Fig:4.2 Dataflow diagram**



**Fig 4.3 Usecase diagram**

**Algorithms and methodology**

**CollaborativeFiltering (CF):**

CF analyses user behaviour (such as past purchases, views, ratings) to recommend similar products.

- It includes two main approaches:
- User-Based Collaborative Filtering: Finds users with similar interests and recommends items based on their preferences.
- Item-Based Collaborative Filtering: Recommends products similar to ones the user has interacted with.
- CF is widely used due to its simplicity and effectiveness

**Content-Based Filtering:**

- Content-based filtering recommends items based on their attributes.

- It considers user preferences and item characteristics (e.g., genre, keywords, features).
- Useful for suggesting similar items to those the user has liked or interacted with
- Finds users with similar interests and recommends items based on their preferences.

### 3.2.4 Microservices Architecture for E-HORTI:

A detailed look at the microservices architecture:

#### 1. Microservices Components:

- (i)User Interface (Web and Mobile):(i)Interacts with users.

#### Routing Layer:

API Gateway, Load Balancer, Service Registry.

#### Microservices:

- (i)Inventory Service: Manages product availability.
- (i)Payment Service: Handles transactions.
- (i)Recommendation: Suggests related products

#### Databases:

Each microservice has its own database.

- (i)CommunicationPatterns:(i)Synchronous: User requests handled immediately

#### Asynchronous Communication:

Event-driven (e.g., payment processing).

#### Benefits and Challenges:

##### Benefits:

- (i)Scalability:Scale individual services
- (i)Fault Isolation: Failures don't affect others.
- (i)Parallel Development: Multiple teams work si

##### Challenges:

Service Discovery: Managing service locations.  
Data Consistency: Ensuring consistency.

#### Internal Architecture of E-HORTI:

A more detailed exploration of E-HORTI architecture:

- (i)Three-Tier Architecture:(i)Presentation Layer (UI):
- (i)Handles user interaction.(i)Business Logic Layer:
- (i)Contains core logic (inventory, orders).

#### Data Storage Layer:

Manages data storage (product details)

#### Client-Side and Server-Side Layers:

- (i)Client-Side (Front End):(i)User interface.
- (i)Server-Side (Back End):
- (i)Business logic, data storage, external service.

#### Choosing the Right Architecture:

Consider scalability, maintainability, and security.Align the architecture with project requirements.

#### FEASIBILITY STUDY

The feasibility study is carried out to test whether the proposed system is worth being implemented. The proposed system will be selected if it is best enough in meeting the performance requirements. The feasibility study is carried out to test whether the proposed system is worth being implemented. The proposed system will be selected if it is best enough in meeting the performance requirements.

#### Economic Feasibility

##### Cost Analysis:

**Development Costs:** Break down the expenses related to website development. Consider design, coding, and testing. Estimate the time and resources required for each phase.

**Infrastructure Costs:** Include hosting fees, domain registration, and SSL certificates.

**Payment Gateway Integration:** Evaluate costs associated with integrating payment gateways (e.g., transaction fees, setup charges).

**Customer Support Setup:** Factor in costs for customer service tools, chatbots, or hiring support staff.

##### Financial Benefits:

**Revenue Streams:** Identify potential revenue sources (product sales, subscriptions, ads, etc.).

**ROI Calculation:** Estimate the return on investment over time. Consider both short-term and long-term gains.

**Break-Even Point:** Determine when the website will cover its initial costs. Non-Financial Benefits:

**User Experience:** Understand user needs and preferences. Conduct usability testing to improve the overall experience.

**Brand Reputation:** A well-designed e-commerce site enhances your brand image.

**Scalability:** Consider future growth and how the website can adapt.

**Technical Feasibility:**

**Technology Stack:** Choose appropriate technologies (e.g., CMS platforms, programming languages, frameworks).

**Scalability and Performance:** Assess whether the chosen tech stack can handle increasing traffic and transactions.

**Security Measures:** Implement robust security protocols to protect user data.

**Market Research:**

**Market Size and Trends:** Analyze the e-commerce market in your niche. Understand customer behavior, preferences, and purchasing patterns.

**Competitor Analysis:** Study successful e-commerce websites. Identify their strengths and weaknesses.

**Unique Selling Proposition (USP):** Define what sets your website a

**Risk Evaluation:**

**Technical Risks:** Consider potential issues during development (bugs, compatibility issues, etc.).

**Market Risks:** Assess market volatility, changing consumer behavior, and economic factors.

**Legal and Regulatory Risks:** Understand compliance requirements (data protection, taxes, etc.).

**Decision and Reporting:**

**Go/No-Go Decision:** Based on the study, decide whether to proceed with the e-horti web application

**Stakeholder Communication:** Prepare a detailed report summarizing findings, risks, and recommendations.

Share it with More commonly known as cost benefit analysis. This procedure determines the benefits and saving that are expected from the system of the proposed system. The hardware in system department if sufficient for system development.

## V. RESULTS

The following screenshots are the results for E-Horti web application

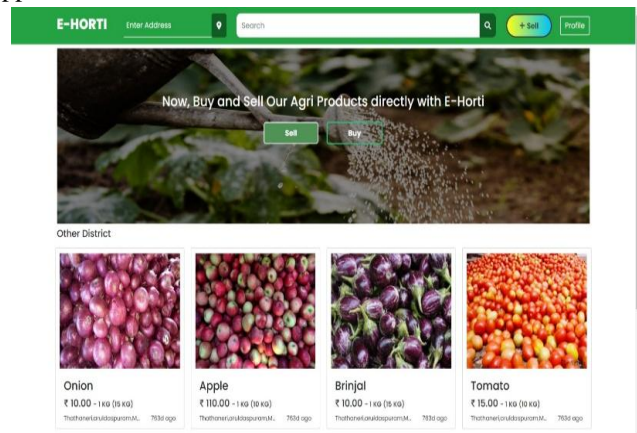


Fig : 5.1 landing page

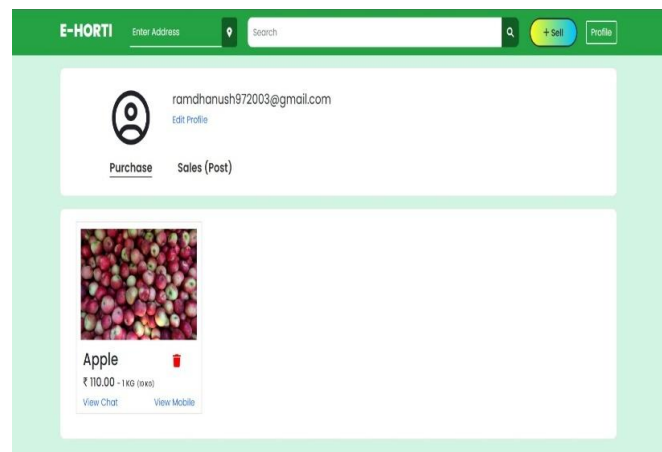


Fig : 5.1 Purcahe page

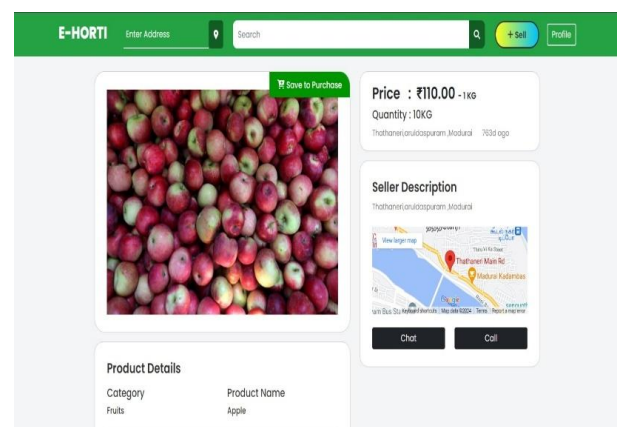
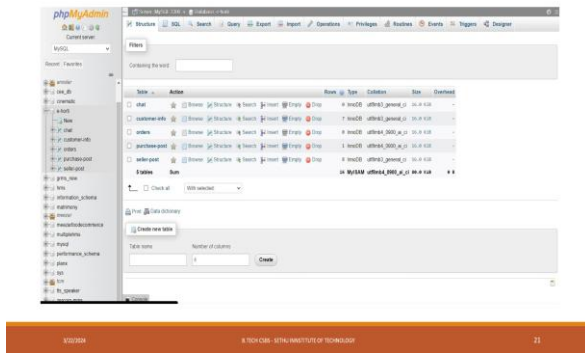


Fig : 5.1 Product page



**Fig : 5.1 Database**

## VI. CONCLUSION

Thus E-Hort app connects buyers and sellers. Its key features include free listings, a wide reach, and direct interaction between users. Thus E-Hort app connects buyers and sellers. Its key features include free listings, a wide reach, and direct interaction between users. Sellers can create ads without any cost, and the large user base ensures broad visibility for listings. Buyers and sellers communicate directly, simplifying transactions. E-Horti App will be greatly beneficial to the horticulture community. A chat and call option to the buyer/seller is also made available for the requirement and price negotiation. We create employment and open new market opportunities for fruit and vegetables to play a pivotal role in fighting the micronutrient deficiencies and over nourishment. E-Horti facilitates these interactions online

## VII. FUTURE ENHANCEMENT

### AI based chat bot for E-Horti application:

Implementation of an AI based chat bot provide a natural and familiar modality for communication where the Farmers don't need to learn new technical concepts or interaction methods. There's little requirement for literacy, making it accessible to a wide audience. Agriculture experts can easily edit or customize the chatbot's knowledge base. Farmers can get instant answers to their queries without waiting for human experts. Chatbots provide timely information on weather, crop protection, and best practices. Chatbots can deliver real-time weather forecasts. Farmers can plan their activities based on weather conditions, optimizing crop management. Chatbots help farmers identify crop diseases and pests.

### Warehouses for E-Horti:

Warehouses provide safe storage for agricultural produce. By minimizing exposure to external factors (such as weather, pests, and rodents), warehouses help reduce post-harvest losses.

Producers and traders can take advantage of intertemporal price differences, arbitrage opportunities, and ensure food security.

Efficient warehouse receipt finance allows farmers to avoid distress sales. Scientific storage adds monetary value to the produce, increasing liquidity in the entire commodity chain. Farmers' access to financing tools enhances their ability to invest in production.

Warehouses help stabilize prices by allowing controlled release of stored commodities into the market. This prevents sudden price fluctuations and benefits both producers and consumers.

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